

## Reliability and Validity of Perceived Heart Risk Factors Scale

The Editor,

Patients' beliefs about the causes of cardiovascular disease (i.e., perceived risk factors) are part of the general mental representations of the disease which derived from patients' health knowledge.<sup>[1]</sup> According to the health belief model, attitudes and cognitive beliefs of patients and emotional reactions to the illness and treatment can be independently predicted their health behavior,<sup>[2]</sup> so that the mismatch between actual and perceived risk factors can affect the patient's cognitions and it may lead to the increased psychological symptoms and negative consequences of the disease.<sup>[3-5]</sup> Causal beliefs and perceived risk factors are associated not only with patients' psychological health and adjustment but also affect adherence to treatment recommendations.<sup>[6,7]</sup> Since heart risk factors influence the emergence and persistence of the disease and understanding these factors can be effective in the secondary prevention and cardiac rehabilitation,<sup>[8]</sup> the evaluation of perceived risk factors can be effective in the controlling of illness symptoms.<sup>[4,5]</sup> Therefore, identifying patients' perception of disease risk factors is necessary providing appropriate and valid instruments.

Based on these considerations, the study aimed to evaluate the reliability and validity of the perceived heart risk factors scale (PHRFS) [Appendix 1]. At first, the content of the items and subscales' categories was prepared using the report about perceived risk factors in the several related studies.<sup>[4-7,9]</sup> Then, the scale of which has 27 items and 5 subscales delivered to the 13 health-care professionals (5 cardiologists, 1 specialist in sports medicine, 3 General Physician (GP) at the heart emergency, 1 MSc in Nutrition, 2 MSc in Clinical Psychology, and the head nurse of Cardiac Rehabilitation Department) for that need of items exists to be examined by using the proposed method by Lawshe. According to health-care professionals' perspective, two unnecessary items were eliminated and ultimately 25 items remained. Subscales of this 25-item questionnaire include biological (items 1–3), environmental (items 4–8), behavioral (items 9–14), psychological (items 15–21), and physiological risk factors (items 22–25) and any of the items are graded based on the Likert scale (never = 0, little = 1, somewhat = 2, a lot = 3, and extreme = 4). Therefore, the maximum scores for each of the subscales are 12, 20, 24, 28, and 16 points, respectively. Hence, the total score is in the range of 0–100 in the range of 0–100.

In the next step, the scale delivered to the 126 cardiac rehabilitation patients that 121 (96%) of them returned the questionnaires. The patients (23–79 years, with mean and standard deviation  $58.8 \pm 9.7$  years) after the cardiac event to participate in the study were invited to Imam Ali Hospital of Kermanshah city in western part of Iran during January 2015. Given that the recommended minimum

number of participants is 2–5 times the number of items ( $25 \times 5 = 125$ ), the sample size was selected for this study.

<sup>[10]</sup> After written informed consent to participate in the study, demographic data and medical records of the patients were recorded and evaluated by a cardiologist. Then, the questionnaire was delivered to the patients by a clinical psychologist and the patients completed it after receiving the necessary explanations. The items were read by a psychologist for illiterate patients and patients' responses were recorded carefully. Descriptive and inferential statistics included Cronbach's alpha, and principal factors analysis was used to determine the reliability and validity.<sup>[10]</sup> All statistical analyzes were performed using SPSS 20 software (IBM corporation, USA).

Based on the results, 70.2% of the patients were males. Almost 42.1% of the patients were self-employed, 28.1% housekeeper, 20.7% retired, and 9.1% employees. In terms of education level, 69.4% were under diploma, 19.8% diplomas, and 10.7% had academic education. The prevalence levels of myocardial infarction, smoking, diabetes, hypertension, and hyperlipidemia were 18.2%, 31.4%, 26.4%, 41.3%, and 28.1%, respectively. To evaluate the scale reliability, Cronbach's alpha for the total of PHRFS was 0.933 and for each of the subscales of biological, environmental, behavioral, psychological, and physiological was 0.632, 0.826, 0.817, 0.834, and 0.965, respectively. Meanwhile, the determination coefficient ( $R^2$ ) for the all items was 0.300–0.939 and any item that did not meet the criteria was removed from the scale. To verify the scale validity using principal factors analysis, initially overruns of the assumptions (including the normality and linear relationship of variables) were studied and verified. Then, the adequacy of the sample size and the items ability to categorize platforms was approved using the Kaiser–Meyer–Olkin Measure of Sampling Adequacy (KMO) test (0.931) and Bartlett's test of sphericity (Chi-square = 2998.65;  $P < 0.0005$ ). In addition, the anti-image matrix correlation values indicate that the KMO values for the items are in the range of 0.724–0.958. Thus, according to the KMO, value for all items was higher than 0.5, the adequacy of the sample size was verified again, and it was found that there is no need to remove any item.

In the principal components analysis, extracted communalities showed that 33.7%–91.4% variance items are explained by the extracted factors. To evaluate the factor analysis solution, the five components with eigenvalues  $>1$  (1.150–10.197) were found that were confirmed by the scree plot. These components together explained 67.1% variance that showed factor analysis solution has been a good solution for principal components. Table 1 indicates

**Table 1: Factor loadings before and after varimax rotation**

Item	Component matrix					Rotated component matrix				
	1	2	3	4	5	1	2	3	4	5
1	0.437	-0.137	0.297	0.135	0.244		0.454			
2	0.455	0.176	0.094	0.404	0.180				0.605	
3	0.430	0.194	0.214	0.390	0.308				0.685	
4	0.684	0.310	0.164	0.071	0.136				0.521	
5	0.574	0.602	0.227	0.058	-0.053				0.533	
6	0.443	0.606	0.325	0.225	-0.245					0.638
7	0.515	0.268	0.205	-0.264	0.113			0.456		
8	0.686	0.477	-0.137	-0.145	0.051			0.727		
9	0.780	0.340	-0.314	-0.179	0.110			0.818		
10	0.782	0.320	-0.348	-0.194	0.182			0.852		
11	0.595	0.237	-0.501	-0.244	0.190			0.810		
12	0.597	-0.157	0.263	0.122	0.148		0.509			
13	0.610	-0.275	0.313	0.001	0.168		0.655			
14	0.561	0.026	0.085	0.103	0.067				0.338	
15	0.606	-0.535	0.210	-0.179	0.236		0.835			
16	0.697	-0.454	0.020	-0.149	0.158		0.713			
17	0.553	-0.343	0.402	-0.259	-0.167		0.712			
18	0.509	0.127	0.238	-0.386	-0.275					0.568
19	0.737	-0.171	0.113	-0.238	0.024		0.613			
20	0.724	-0.200	-0.067	-0.090	-0.163	0.523				
21	0.412	0.149	0.228	-0.030	-0.614					0.735
22	0.793	-0.289	-0.293	0.243	-0.194	0.856				
23	0.790	-0.298	-0.256	0.264	-0.179	0.842				
24	0.829	-0.202	-0.301	0.221	-0.213	0.844				
25	0.820	-0.239	-0.208	0.206	-0.163	0.781				

factor loadings before and after varimax rotation. As it turns out, items 20, 22, 23, 24, and 25 on the first factor, items 1, 12, 13, 15, 16, 17, and 19 on the second factor, items 7, 8, 9, 10, and 11 on the third factor, items 2, 3, 4, 5, and 14 on the fourth factor, and items 6, 18, and 21 on the fifth factor are loading. Overall, our results showed that the PHRFS is a credible tool with suitable validity and reliability for assessing the attitudes of cardiovascular patients about the illness risk factors.

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#### Conflicts of interest

There are no conflicts of interest.

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## Appendix

### Appendix 1: Perceived heart risk factors scale

1. How effective is genetics and family history in the development of heart disease?
2. How effective is aging in the development of heart disease?
3. How effective is male or female gender in the development of heart disease?
4. How effective is smoke and toxic substances in the development of heart disease?
5. How effective is polluted water and air in the development of heart disease?
6. How effective is dust in the development of heart disease?
7. How effective is the war between countries in the development of heart disease?
8. How effective is passive smoking in the development of heart disease?
9. How effective is tobacco and hookah smoking in the development of heart disease?
10. How effective is drug abuse in the development of heart disease?
11. How effective is drinking in the development of heart disease?
12. How effective is malnutrition in the development of heart disease?
13. How effective is physical inactivity in the development of heart disease?
14. How effective is physical work pressure in the development of heart disease?
15. How effective is psychological stress in the development of heart disease?
16. How effective is anger and rage in the development of heart disease?
17. How effective is emotions such as fear or joy in the development of heart disease?
18. How effective is sadness and grief caused by the death of loved ones in the development of heart disease?
19. How effective is depression (sadness and hopelessness) in the development of heart disease?
20. How effective is marital discord and misbehavior by wife in the development of heart disease?
21. How effective is discomfort due to financial problems and lack of money in the development of heart disease?
22. How effective is high cholesterol in the development of heart disease?
23. How effective is hypertension in the development of heart disease?
24. How effective is diabetes in the development of heart disease?
25. How effective is obesity and overweight in the development of heart disease?